

WHAT IS CLAIMED IS:

1. A liquid crystal display device, comprising:  
a display circuit including data lines and scanning lines arranged in a two-dimensional matrix, and switching elements connected between said data lines and said scanning lines;

a first inspection circuit including an inspection voltage input and/or output terminal for inputting and/or outputting an inspection voltage to/from one end of said data line via a first analog switch; and

a second inspection circuit including an inspection voltage input and/or output terminal for inputting and/or outputting an inspection voltage to/from another end of said data line,

wherein said display circuit, said first inspection circuit, and said second inspection circuit are provided on one substrate, and said first inspection circuit is separable from said display circuit.

2. The liquid crystal display device according to claim 1,

wherein said first and second inspection circuits are separable from said display circuit.

3. The liquid crystal display device according to claim 1,

wherein said first inspection circuit has a second analog switch with a control terminal

connected to a shift register, and one end of said second analog switch is connected to said data line via said first analog switch and another end is connected to said inspection voltage input and/or output terminal, and

wherein said second inspection circuit has a third analog switch, and one end of said third analog switch is connected to the other end of said data line and another end is connected to said inspection voltage input and/or output terminal.

4. The liquid crystal display device according to claim 3,

wherein an inspection transistor is provided at an end of each of said scanning lines, a scanning line driver is connected to a gate terminal of said inspection transistor, an inspection voltage input/output terminal is connected to a drain or source terminal, and a capacitor is connected to the source or drain terminal.

5. The liquid crystal display device according to claim 3,

wherein said shift register of said first inspection circuit turns on said second analog switch to check from said inspection voltage output terminal of said first inspection circuit an inspection voltage inputted to said inspection voltage input terminal of said second inspection circuit to thereby inspect a break or a short circuit in said data line.

6. The liquid crystal display device according to claim 3,

wherein said second inspection circuit has first and second inspection voltage input terminals, and said third analog switches are alternately connected to said first and second inspection voltage input terminals, and

wherein said first inspection circuit has first and second inspection voltage output terminals, and said second analog switches are alternately connected to said first and second inspection voltage output terminals.

7. The liquid crystal display device according to claim 6,

wherein said first and second inspection voltage output terminals of said first inspection circuit are capable of verifying whether a break or a short circuit is caused in said data lines by checking outputs of inspection voltages inputted to said first and second inspection voltage input terminals of said second inspection circuit.

8. The liquid crystal display device according to claim 7,

wherein different inspection voltages are inputted to said first and second inspection voltage input terminals of said second inspection circuit.

9. The liquid crystal display device according to claim 3,

wherein said first inspection circuit has first and second inspection voltage input/output terminals, and said second analog switches are connected alternately to said first and second inspection voltage input/output terminals.

10. The liquid crystal display device according to claim 9,

wherein said first inspection circuit is capable of checking a short circuit between lines connecting said first and second analog switches by verifying whether an inspection voltage inputted to said first inspection voltage input/output terminal is outputted from said second inspection voltage input/output terminal while said first analog switches are turned off.

11. The liquid crystal display device according to claim 4,

wherein said inspection transistor is provided to input an inspection voltage to the drain or source terminal via said inspection voltage input/output terminal, to charge said capacitor connected to the source or drain terminal with said inspection voltage when said inspection transistor is turned on by said scanning line driver, and to check said inspection voltage stored in said capacitor from said inspection voltage input/output terminal when said inspection transistor is turned on again by said scanning line driver.

12. A method of inspecting the liquid crystal display device claimed in claim 3, comprising the steps of:

(a) turning on said first to third analog switches; and

(b) inspecting a break or a short circuit in said data line by checking from said inspection voltage output terminal of said first inspection circuit the inspection voltage inputted to said inspection voltage input terminal of said second inspection circuit.

13. A method of inspecting the liquid crystal display device claimed in claim 6, comprising the steps of:

(a) turning on said first to third analog switches to connect said first and second inspection voltage input terminals of said second inspection circuit to said first and second inspection voltage output terminals of said first inspection circuit respectively; and

(b) verifying whether a break or a short circuit is caused in said data lines by verifying whether the inspection voltages inputted to said first and second inspection voltage input terminals of said second inspection circuit are outputted from said first and second inspection voltage output terminals of said first inspection circuit.

14. A method of inspecting the liquid crystal display device claimed in claim 9, comprising the steps of:

(a) turning on said second analog switches corresponding to said first and second inspection voltage input/output terminals of said first inspection circuit and turning off said first analog switches; and

(b) checking a short circuit between lines connecting said first and second analog switches by verifying whether the inspection voltage inputted to said first inspection voltage input/output terminal of said first inspection circuit is detected from said second inspection voltage input/output terminal of said first inspection circuit.

15. A method of inspecting the liquid crystal display device claimed in claim 4, comprising the steps of:

(a) turning on said inspection transistor by said scanning line driver;

(b) inputting an inspection voltage to the drain or source terminal of said inspection transistor via said inspection voltage input/output terminal to charge with said inspection voltage said capacitor connected to the source or drain terminal of said inspection transistor;

(c) turning on said inspection transistor again by said scanning line driver; and

(d) verifying whether the inspection voltage stored in said capacitor is outputted from said inspection voltage input/output terminal.

16. A liquid crystal display device, comprising:  
first switching elements connected to liquid crystal capacitors via pixel electrodes respectively;  
data lines for supplying data to said first switching elements;

scanning lines for controlling said first switching elements; and

second switching elements each having a control terminal connected to said data line or said scanning line, and an input/output terminal with one end connected to a common inspection input/output terminal and another end connected to a capacitor.

17. The liquid crystal display device according to claim 16, further comprising:

a data supply circuit including a data line driver or a switching element for supplying data to said data line; and

a scanning signal supply circuit for supplying scanning signals to said scanning line.

18. The liquid crystal display device according to claim 16,

wherein said capacitor increases a storable capacity thereof by connecting one end thereof to said second switching element and another end in common.

19. The liquid crystal display device according to claim 16,

wherein said other end of said second switching element is connected to said liquid crystal capacitor via said pixel electrode.

20. The liquid crystal display device according to claim 16,

wherein said second switching elements include switching elements with control terminals connected to said data lines and switching elements with control terminals connected to said scanning lines.

21. The liquid crystal display device according to claim 16,

wherein said one end of said second switching element is connected to a common inspection input/output terminal and said data line.

22. The liquid crystal display device according to claim 16, further comprising:

a third switching element for resetting or presetting said capacitor connected to said second switching element.

23. The liquid crystal display device according to claim 16,

wherein said second switching elements are provided inside a sealing part for sealing liquid crystal in said liquid crystal display device.

24. The liquid crystal display device according to claim 16,



wherein said second switching elements are provided outside a sealing part for sealing liquid crystal in said liquid crystal display device.

25. The liquid crystal display device according to claim 20,

wherein said switching elements connected to said data lines and said switching elements connected to said scanning lines are connected to a common inspection input/output terminal.

26. The liquid crystal display device according to claim 20,

wherein said switching elements connected to said data lines and said switching elements connected to said scanning lines are connected to different inspection input/output terminals.

27. The liquid crystal display device according to claim 19, further comprising:

a light shield for shielding from light pixels corresponding to said second switching elements.